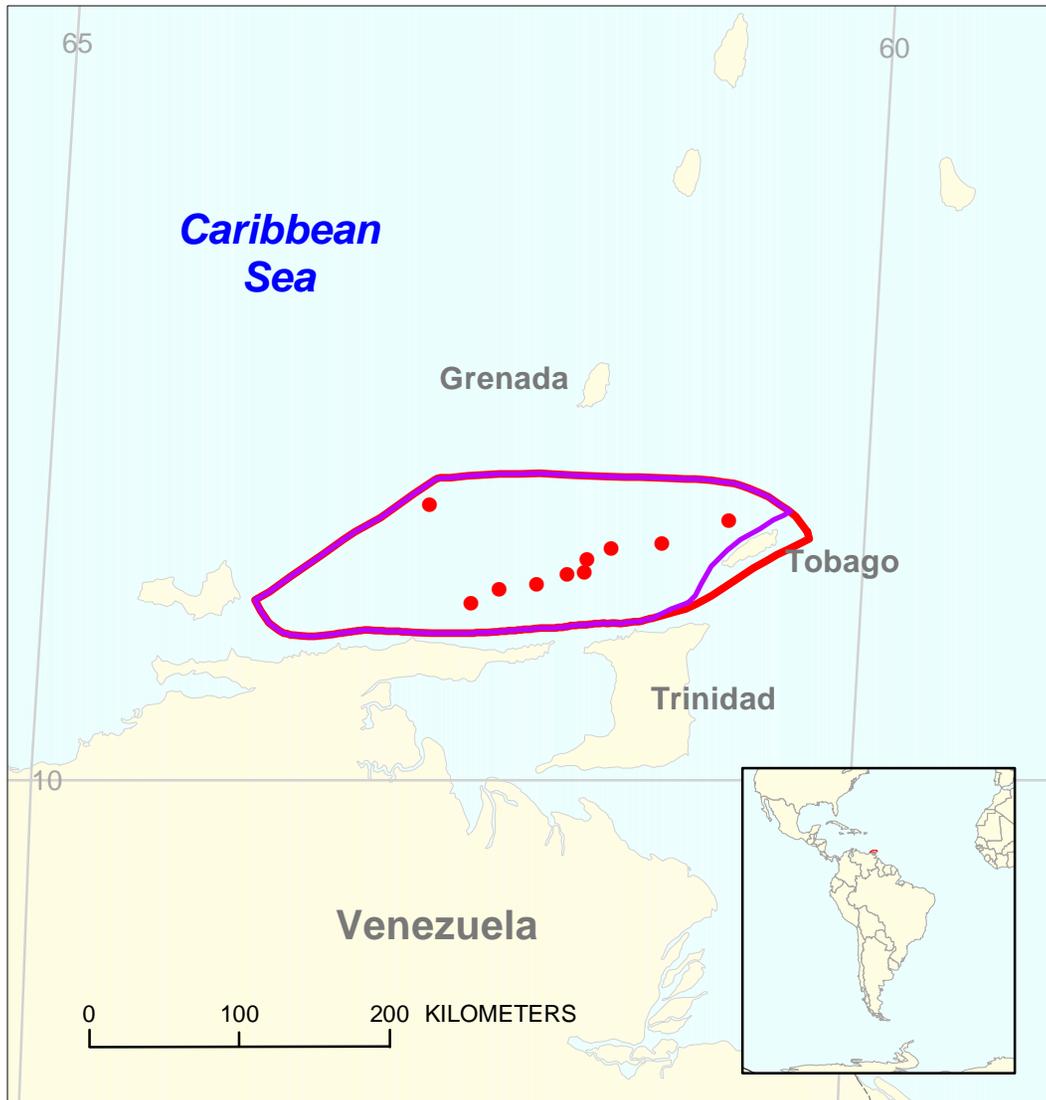


Carupano Basin Gas Assessment Unit 61030101



-  Carupano Basin Gas Assessment Unit 61030101
-  Tobago Trough Geologic Province 6103

USGS PROVINCE: Tobago Trough (6103)

GEOLOGIST: C.J. Schenk

TOTAL PETROLEUM SYSTEM: Lower Cruse (610301)

ASSESSMENT UNIT: Carupano Basin Gas (61030101)

DESCRIPTION: The Carupano Basin is the southernmost part of the larger Tobago Trough. The assessment unit is defined by a wide zone of faulting associated with the southern wrench fault boundary of the Caribbean plate. The northern boundary of the assessment unit is the shelf slope break. Approximately 25 TCF gas has been discovered in this assessment unit, with several of the larger structures already tested. The largest field is Patao in Venezuelan waters.

SOURCE ROCKS: Source rocks are postulated to be prodeltaic mudstones coeval with the Miocene Lower Cruse Formation, similar to the Columbus Basin of Trinidad immediately south of this basin.

MATURATION: Mudstones of the lower Cruse Formation are postulated to have reached maturity in the Pliocene following deposition of several kilometers of sediment in the Miocene and lower Pliocene.

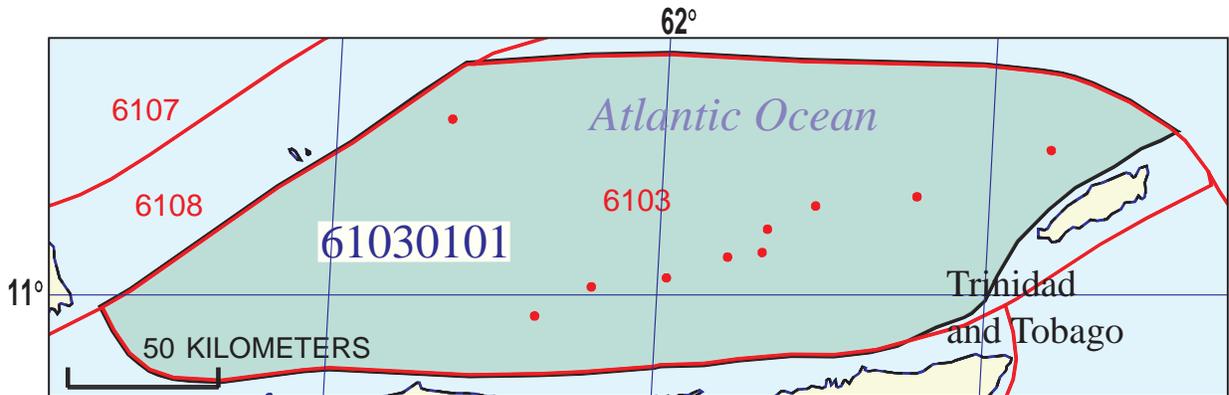
MIGRATION: Migration of hydrocarbons from the lower Cruse mudstones was mainly vertical along faults associated with the wrench fault zone. The timing of faulting was late Pliocene and Pleistocene.

RESERVOIR ROCKS: Reservoirs are mainly deltaic sandstones of the lower Pliocene, but deeper turbiditic sandstones sourced by the ancestral Orinoco River may also be present. The reservoir at Patao is reputed to be in turbidite sandstones.

TRAPS AND SEALS: Traps are mainly structural, with normal fault traps formed by transtension associated with wrench faulting along the 150 km wide fault zone of the southern margin of the Caribbean plate. Traps formed in transpressional segments of the fault zone are also present. Seals are mainly intraformational mudstones of the Pliocene deltaic section.

REFERENCES:

- Leonard, R., 1983, Geology and hydrocarbon accumulations, Columbus Basin, offshore Trinidad: American Association of Petroleum Geologists Bulletin, v. 67, p. 1081-1093.
- Robertson, P., and Burke, K., 1989, Evolution of southern Caribbean plate boundary, vicinity of Trinidad and Tobago: American Association of Petroleum Geologists Bulletin, v. 73, p. 490-509.
- Speed, R., Torrini, R., and Smith, P.L., 1989, Tectonic origin of the Tobago Trough forearc basin: Journal of Geophysical Research, v. 94, no. B3, p. 2913-2936.



Carupano Basin Gas Assessment Unit - 61030101

EXPLANATION

-  Hydrography
-  Shoreline
- 6103**  Geologic province code and boundary
-  Country boundary
-  Gas field centerpoint
-  Oil field centerpoint
- 61030101**  Assessment unit code and boundary

Projection: Robinson. Central meridian: 0

**SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS**

Date:..... 5/18/99
 Assessment Geologist:..... C. J. Schenk
 Region:..... Central and South America Number: 6
 Province:..... Tobago Trough Number: 6103
 Priority or Boutique..... Priority
 Total Petroleum System:..... Lower Cruse Number: 610301
 Assessment Unit:..... Carupano Basin Gas Number: 61030101
 * Notes from Assessor Lower 48 growth factor.

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):... Gas

What is the minimum field size?..... 5 mmboe grown (≥1mmboe)
 (the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:..... Oil: 0 Gas: 10
 Established (>13 fields) Frontier (1-13 fields) X Hypothetical (no fields)

Median size (grown) of discovered oil fields (mmboe):
 1st 3rd 2nd 3rd 3rd 3rd
 Median size (grown) of discovered gas fields (bcfg):
 1st 3rd 2764 2nd 3rd 2135 3rd 3rd

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. CHARGE: Adequate petroleum charge for an undiscovered field ≥ minimum size.....	1.0
2. ROCKS: Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size.....	1.0
3. TIMING OF GEOLOGIC EVENTS: Favorable timing for an undiscovered field ≥ minimum size	1.0

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):..... 1.0

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field
 ≥ minimum size..... 1.0

UNDISCOVERED FIELDS

Number of Undiscovered Fields: How many undiscovered fields exist that are ≥ minimum size?:
 (uncertainty of fixed but unknown values)

Oil fields:.....min. no. (>0) median no. max no.
 Gas fields:.....min. no. (>0) 10 median no. 70 max no. 200

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
 (variations in the sizes of undiscovered fields)

Oil in oil fields (mmbo).....min. size median size max. size
 Gas in gas fields (bcfg):.....min. size 30 median size 96 max. size 10000

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

<u>Oil Fields:</u>	minimum	median	maximum
Gas/oil ratio (cfg/bo).....	_____	_____	_____
NGL/gas ratio (bnl/mmcf).....	_____	_____	_____
 <u>Gas fields:</u>	 minimum	 median	 maximum
Liquids/gas ratio (bnl/mmcf).....	5	10	15
Oil/gas ratio (bo/mmcf).....	_____	_____	_____

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

<u>Oil Fields:</u>	minimum	median	maximum
API gravity (degrees).....	_____	_____	_____
Sulfur content of oil (%).....	_____	_____	_____
Drilling Depth (m)	_____	_____	_____
Depth (m) of water (if applicable).....	_____	_____	_____
 <u>Gas Fields:</u>	 minimum	 median	 maximum
Inert gas content (%).....	_____	_____	_____
CO ₂ content (%).....	_____	_____	_____
Hydrogen-sulfide content(%).....	_____	_____	_____
Drilling Depth (m).....	1000	2500	5000
Depth (m) of water (if applicable).....	10	100	200

**ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT
TO COUNTRIES OR OTHER LAND PARCELS** (uncertainty of fixed but unknown values)

1. Trinidad and Tobago represents 40 areal % of the total assessment unit

<u>Oil in Oil Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	_____	_____
Portion of volume % that is offshore (0-100%):.....	_____	_____	_____
<u>Gas in Gas Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	36	_____
Portion of volume % that is offshore (0-100%):.....	_____	100	_____

2. Venezuela represents 56 areal % of the total assessment unit

<u>Oil in Oil Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	_____	_____
Portion of volume % that is offshore (0-100%):.....	_____	_____	_____
<u>Gas in Gas Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	60	_____
Portion of volume % that is offshore (0-100%):.....	_____	100	_____

3. Grenada represents 4 areal % of the total assessment unit

<u>Oil in Oil Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	_____	_____
Portion of volume % that is offshore (0-100%):.....	_____	_____	_____
<u>Gas in Gas Fields:</u>	minimum	median	maximum
Richness factor (unitless multiplier):.....	_____	_____	_____
Volume % in parcel (areal % x richness factor):...	_____	4	_____
Portion of volume % that is offshore (0-100%):.....	_____	100	_____

Carupano Basin Gas, AU 61030101 Undiscovered Field-Size Distribution

